

CLAIMS

What is claimed is:

1. A treadmill comprising:
a frame;
a power supply;
a motor coupled to the power supply, the motor including
a shaft and a stator fixedly coupled to the frame,
at least one bearing coupled to the shaft, and
a rotor coupled to the at least one bearing, the rotor including a portion
that surrounds at least a portion of the stator; and
a conveyer coupled to the frame and to the rotor, the conveyer being driven at
a rotational speed that is different than a rotational speed of the rotor.
2. A treadmill as set forth in claim 1 wherein the shaft and stator are a unitary
element.
3. A treadmill as set forth in claim 1 wherein the stator includes one or more
wires that create a plurality of magnetic poles when the motor receives an electrical
power, and
wherein the rotor includes a plurality of magnets operable to magnetically
interact with the plurality of magnetic poles, thereby causing rotation of the rotor.
4. A treadmill as set forth in claim 3 wherein the rotor further includes a back
iron,
wherein the magnets are coupled to the back iron, and
wherein the back iron includes a superfluous mass such that, when the rotor
rotates, the superfluous mass produces kinetic energy for smoothing a shock load
applied to the motor.
5. A treadmill as set forth in claim 4 wherein the back iron is a permeable-
magnetic metal back iron.

6. A treadmill as set forth in claim 5 wherein the rotor further includes at least one endplate, wherein the at least one endplate includes a second superfluous mass such that, when the rotor rotates, the second superfluous mass produces additional kinetic energy for smoothing the shockload.

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7. A treadmill as set forth in claim 1 and further comprising a pulley-and-belt assembly having at least one pulley and at least one belt, the pulley-and-belt assembly coupling the rotor to the conveyer.

10 8. A treadmill as set forth in claim 7 wherein the pulley-and-belt assembly includes a first pulley coupled to the rotor, a second pulley coupled to the conveyer, and a belt coupled to the first and second pulleys.

15 9. A treadmill as set forth in claim 1 and further comprising a gear assembly having two or more gears, the gear assembly coupling the rotor to the conveyer.

20 10. A treadmill as set forth in claim 9 wherein the gear assembly includes a first gear coupled to the rotor and a second gear coupled to the conveyer, wherein the second gear is driven by the first gear.

25 11. A treadmill as set forth in claim 1 and further comprising a sprocket-and-chain assembly having at least one sprocket and at least one chain, the sprocket-and-chain assembly coupling the rotor to the conveyer.

30 12. A treadmill as set forth in claim 11 wherein the sprocket-and-chain assembly includes a first sprocket coupled to the rotor, a second sprocket coupled to the conveyer, and a chain coupling the first and second sprockets.

13. A treadmill as set forth in claim 1 and further comprising a multiple-speed-transmission assembly coupling the rotor to the conveyer.

14. A treadmill comprising:
a frame;
control circuitry including a power source;
a motor coupled to the control circuitry, the motor including
5 a shaft and a stator fixedly coupled to the frame,
a rotor having at least a portion that surrounds at least a portion of the
stator; and
a first pulley coupled to the rotor;
a first belt coupled to the first pulley; and
10 a conveyer having a second pulley coupled to the first belt.

15. A treadmill as set forth in claim 14 wherein the control circuitry includes a controller.

16. A treadmill as set forth in claim 14 wherein the shaft and the stator form a unitary element.

17. A treadmill as set forth in claim 14 wherein the rotor includes the first pulley.

18. A treadmill as set forth in claim 14 wherein the conveyer is driven at a rotational speed that is different than a rotational speed of the rotor.

19. A treadmill as set forth in claim 14 wherein the motor further includes first and second bearings coupled to the shaft, and

25 wherein the rotor is coupled to the bearings, thereby allowing the rotor to rotate.

20. A treadmill as set forth in claim 19 wherein the stator includes one or more wires that create a plurality of magnetic poles when the motor receives an electrical
30 power,

wherein the rotor includes a plurality of magnets operable to magnetically interact with the plurality of poles, thereby causing the rotation of the rotor.

21. A treadmill as set forth in claim 20, wherein the rotor further includes a back iron,

wherein the magnets are coupled to the back iron, and

wherein the back iron includes a superfluous mass such that, when the rotor rotates, the superfluous mass produces kinetic energy for smoothing a shock load applied to the motor.

22. A treadmill as set forth in claim 21 wherein the back iron is a permeable magnetic metal back iron.

23. A treadmill as set forth in claim 21 wherein the rotor further includes at least one endplate,

wherein the at least one endplate includes a second superfluous mass such that, when the rotor rotates, the second superfluous mass produces additional kinetic energy for smoothing the shock load.

24. A treadmill comprising:

a frame;

a power supply;

a controller coupled to the frame and the power supply;

a motor coupled to the to power supply, the motor including

a shaft and a stator fixedly coupled to the frame by at least one fastener, the stator including one or more wires that create a plurality of magnetic poles when the motor receives an electrical power from the power supply,

first and second bearings coupled to the shaft,

a rotor including a permeable magnetic back iron, a plurality of magnets coupled to the back iron, a first endplate coupled to the back iron and the first bearing, and a second endplate coupled to the back iron and the second bearing, wherein at least a portion of the back iron encircles at least a portion of the stator, and the back iron, first endplate and second endplate include a superfluous mass such that, when the rotor rotates, the superfluous mass produces additional kinetic energy for smoothing a shock load applied to the rotor, and

a first pulley coupled to the rotor;

a first belt coupled to the first pulley;

a roller having a second pulley coupled to the first belt and being driven at a rotational speed that is different than a rotational speed of the rotor; and

a second-belt coupled to the roller.

25. A treadmill as set forth in claim 24 wherein the rotor includes the first pulley.

26. A treadmill as set forth in claim 25 wherein the shaft and the stator form a unitary element.